

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date  
1 September 2005 (01.09.2005)

PCT

(10) International Publication Number  
WO 2005/081069 A1

(51) International Patent Classification<sup>7</sup>: G03F 7/20

(21) International Application Number: PCT/NL2005/000129

(22) International Filing Date: 22 February 2005 (22.02.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/546,165 23 February 2004 (23.02.2004) US  
10/853,724 26 May 2004 (26.05.2004) US

(71) Applicant (for all designated States except US): ASML Netherlands B. V. [NL/NL]; De Run 6501, NL-5504 DR Veldhoven (NL).

(71) Applicant and  
(72) Inventor (for US only): CRAMER, Hugo, Augustinus, Joseph [NL/NL]; Diepmeerven 72, NL-5646 HB Bindhoven (NL).

(72) Inventors; and  
(75) Inventors/Applicants (for US only): VAN DER LAAN,

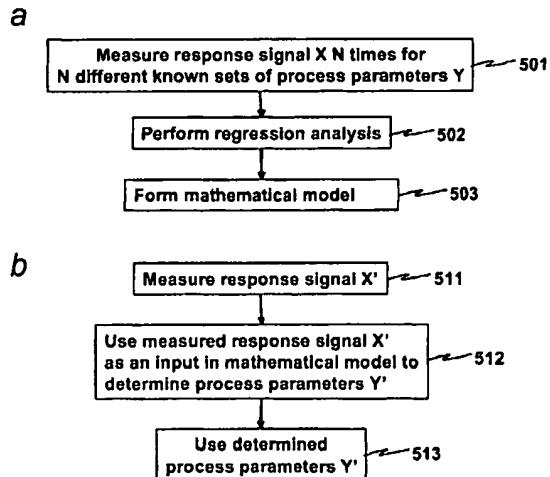
(74) Agent: VAN WESTENBRUGGE, Andries; Nederlandse Octrooibureau, P.O. Box 29720, NL-2502 LS The Hague (NL).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,

[Continued on next page]

(54) Title: METHOD TO DETERMINE THE VALUE OF PROCESS PARAMETERS BASED ON SCATTEROMETRY DATA



WO 2005/081069 A1

(57) Abstract: A method according to an embodiment includes obtaining calibration measurement data, with an optical detection apparatus, from a plurality of marker structure sets provided on a calibration substrate. Each marker structure set includes at least one calibration marker structure created using different known values of the process parameter. The method includes obtaining measurement data, with the optical detection apparatus, from at least one marker structure provided on a substrate and exposed using an unknown value of the process parameter; and determining the unknown value of the process parameter from the obtained measurement data by employing regression coefficients in a model based on the known values of the process parameter and the calibration measurement data.



FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Published:**

— *with international search report*